

BOTANY.—*The genus Calatola*.¹ PAUL C. STANDLEY, U. S. National Museum.

In 1923 the writer published in the *Trees and Shrubs of Mexico*² a new genus of Mexican trees, *Calatola*, which was referred doubtfully to the family *Icacinaceae*. It had been intended to publish previously a fuller account of the genus, with an illustration of one of the species, and a description of a third species, native of Costa Rica, but the publication of the paper was delayed. During a visit to Costa Rica in 1925–26 further material of the Costa Rican tree was obtained, together with interesting data concerning its economic applications. The purpose of the present paper is to give an account of the information now available with regard to the genus.

CALATOLA Standl. Contr. U. S. Nat. Herb. 23: 688. 1923.

Trees; leaves alternate, petiolate, the blades membranaceous or coriaceous, entire; flowers dioecious, very small, the staminate bracteate, arranged in long slender solitary axillary spikes, the pistillate axillary, solitary and pedunculate or in few-flowered spikelike inflorescences; calyx of the staminate flower small, 4-lobate; corolla of the staminate flowers 4-parted, the lobes concave, valvate, 1-costate on the inner surface and sparsely villous along the costa; stamens 4, alternate with the corolla lobes, erect, basifixed, the filaments very short, adnate to the corolla, the anthers oblong, 2-celled, dehiscent by lateral slits; calyx of the pistillate flower 4-lobate; ovary 1-celled; fruit drupaceous, large, globose, oval, or obovoid, the flesh thick, the stone thick and osseous, bicristate and with numerous irregular reticulate dentate crests over the whole surface; seed large, the surface irregularly convolute, the embryo large, the endosperm copious, fleshy.

Type species, *Calatola mollis* Standl.

In flower characters the genus seems to agree reasonably well with the family *Icacinaceae*, but in general appearance it does not much resemble other members of the family. The strictly spicate character of the staminate spikes, which strongly suggest catkins, is not matched in other genera of the *Icacinaceae*, and the fruit also exhibits certain peculiarities. The flowers, however, are much like those of the common representatives of the family. Among the American genera, the only ones that appear to be related are *Mappia* and *Kummeria*, both of which differ in their long filaments and 5-parted flowers.

Although the material at hand is rather ample, the result of its study has been far from satisfactory, and study of the trees in the forest has failed to give a better clue to their relationship. It may be that further study will

¹ Published by permission of the Secretary of the Smithsonian Institution. Received July 29, 1926.

² Contr. U. S. Nat. Herb. 23: 688. 1923.

necessitate the reference of the genus *Calatola* to some other family, or even its recognition as the type of a distinct family.

The generic name *Calatola* is the vernacular name of one of the Mexican species.

It is of interest to record here the fact that Dr. E. W. Berry has published³ recently the description of a genus, *Calatoloides*, based upon fossil fruits from the Wilcox Group of the lower Eocene strata of southwestern Texas. Dr. Berry states that, so far as he is aware, no representative of the family *Icacinaeae* has ever before been found fossil. The fruit of *Calatoloides eocenicum*, as figured, is strikingly like that of the genus *Calatola*, but only half as large.

KEY TO THE SPECIES

Leaves densely soft-pubescent beneath over the whole surface.

1. *C. mollis*.

Leaves glabrous beneath, or densely barbate in the axils of the lateral nerves.

Leaves glabrous beneath or nearly so, not at all barbate; staminate spikes very dense. 2. *C. laevigata*.

Leaves densely barbate beneath in the axils of the lateral nerves; staminate spikes loosely flowered and somewhat interrupted.

3. *C. costaricensis*.

1. CALATOLA MOLLIS Standl. Contr. U. S. Nat. Herb. 23: 689. 1923.

Fig. 1.

Tree, the branches terete, densely pilose when young with short fulvous-grayish hairs; petioles stout, 3-4.5 cm. long, pilose; leaf blades oval-elliptic, oblong-oval, or oblong-obovate, 21-30 cm. long, 8-14 cm. wide, obtuse or rounded at base, acute or abruptly short-acuminate at apex, when young short-pilose on the upper surface but soon glabrate except along the nerves, densely short-pilose beneath, the costa slender, prominent, the lateral nerves 7-9 on each side, ascending at an angle of about 50°, subarcuate, laxly anastomosing near the margin; staminate spikes 8-21 cm. long, about 6 mm. in diameter, densely flowered, the rachis short-pilose, the bracts small, ovate-acuminate; calyx densely white-pilose outside, glabrous within, the lobes oblong-oval, obtuse; corolla 2 mm. long, the lobes obtuse, sparsely villous outside along the costa; anthers 1.2 mm. long, the filaments about 0.3 mm. long; pistillate flowers solitary; peduncle of the fruit (in one immature specimen) 1.5 cm. long; fruit densely and closely tomentose, the stone 5-5.5 cm. long, 4-4.5 cm. in diameter, covered outside with very numerous thin, sharp, irregularly dentate, reticulate crests, smooth and brown within; seed about 3 cm. long, brownish.

MEXICO: Zacatlán, Puebla, Apr. 3, 1913, *F. Salazar*, type. Tlatlanquitepec, Distrito de Tepeji, Puebla, collector unknown.

This tree is well known in the State of Puebla, and has been mentioned a few times in literature, but without a Latin name. It has been referred in at least one instance to the *Juglandaceae*, doubtless because of the nutlike fruits, which somewhat suggest walnuts. The staminate spikes, likewise,

³ *Additions to the flora of the Wilcox Group*, U. S. Geol. Surv. Prof. Paper 131: 14. pl. 14, f. 3-5. 1923.

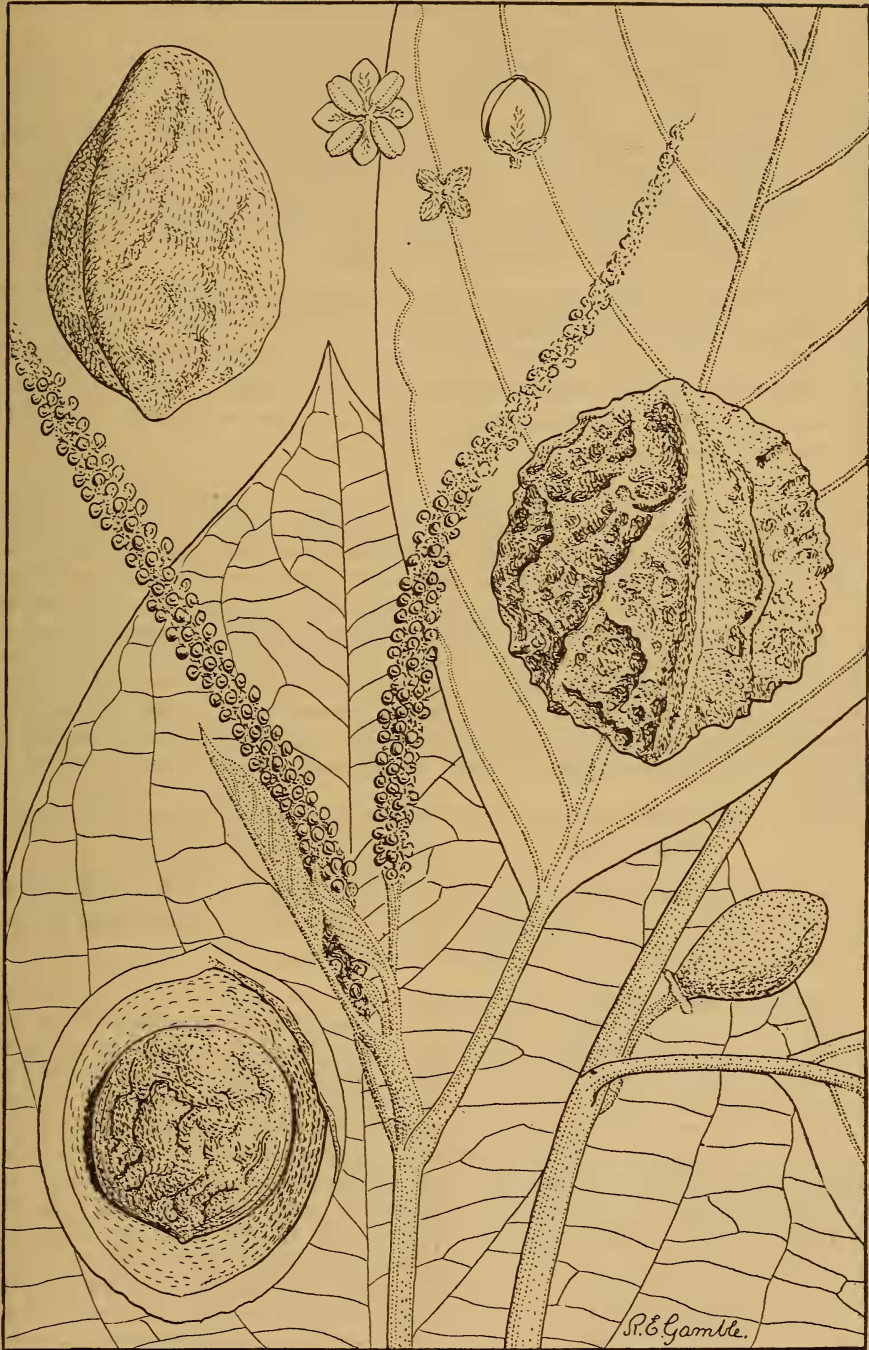


Fig. 1.—*Calatola mollis*. Natural size; floral details $\times 2$.

resemble catkins. The vernacular name of the tree is "calatola;" the fruits are called "nueces de calatola."

Here probably belong specimens of fruits, received from Prof. C. Conzatti, who writes of them as follows: "I send two fruits called 'nuez de calatola.' The plant which bears them is a tree about 20 meters high, called 'calatolazno,' native of Tlatlanqui, Distrito de Zacapoaxtla, Puebla. It grows at an altitude of 650 to 900 meters. It flowers in March and April, and the inflorescences, which I have not seen, are called 'colas de ratas.' The seeds are said to have vomitive-purgative properties."

According to notes made by Dr. W. E. Safford, this tree has been reported from Tabasco and San Luis Potosí, and the name "zapote de mono" sometimes is given to it. The seeds are said to have been employed with good results as a purgative. They are reported to yield a clear yellow oil, and drops of a blue coloring matter which is partly soluble in water or alcohol. It is said that the seeds are sometimes employed for dyeing.

2. *CALATOLA LAEVIGATA* Standl. Contr. U. S. Nat. Herb. 23: 689. 1923.

Branchlets sparsely appressed-pilose or glabrate; petioles 1.5–2 cm. long; leaf blades oblong or narrowly elliptic-oblong, 11.5–16 cm. long, 4–7 cm. wide, acute or obtuse at base, acute at apex, when young sparsely puberulent along the costa but soon glabrous, subcoriaceous, usually drying blackish, entire or obscurely sinuate-serrate, the costa prominent beneath, the lateral nerves about 10 on each side, very slender, arcuate; staminate spikes sessile, 4–6 cm. long (immature; probably much longer in anthesis), very dense, the bracts ovate-acuminate, equaling the flower buds, sericeous; calyx minutely sericeous outside, the lobes obtuse; corolla lobes obtuse, glabrous outside; pistillate flowers in short dense spikes; young fruit sparsely short-sericeous or nearly glabrous.

MEXICO: Cafetal San Carlos, Cerro Espino, Oaxaca, alt. 800 m., *B. P. Reko* 3440, type. Cafetal Calvario, Cerro Espino, Oaxaca, *Reko* 3728.

Calatola laevigata has much narrower leaves than *C. mollis*, and denser staminate spikes. The vernacular name is "palo tinta," from which it may be surmised that the fruits are employed for dyeing.

3. *Calatola costaricensis* Standl., sp. nov.

Tree 6–15 m. high or larger, with a dense, broad or sometimes narrow crown, branchlets and petioles pilose with minute, appressed or ascending, ochraceous hairs, in age glabrate; petioles 2–5 cm. long; leaf blades oblong or elliptic-oblong, 10–25 cm. long, 4.5–10.5 cm. wide, short-acuminate to obtuse, acute at base, somewhat lustrous when fresh but when dry dull and usually blackish, when young sparsely appressed-pubescent above but soon glabrate, beneath densely barbate along the costa, especially in the axils of the nerves, the lateral nerves 6–8 on each side, subarcuate, laxly anastomosing near the margin; staminate spikes about 13 cm. long, very slender and laxly flowered, the rachis hirtellous; calyx hirtellous outside, the lobes obtuse; fruit oval, 5–7 cm. long, glabrous or nearly so, smooth, green, with thick juicy flesh; stone ellipsoid to subglobose, 4.5–6.5 cm. long, 3.5–4 cm. in diameter, rounded or obtuse at each end, bicristate and also with several sharp longitudinal crests and numerous transverse reticulate crests.

Type in the U. S. National Herbarium, no. 1,251,510, collected in wet forest at Yerba Buena, northeast of San Isidro, Provincia de Heredia, Costa Rica, altitude about 2,000 meters, February 28, 1926, by Paul C. Standley and Juvenal Valerio (no. 50,000). The following collections also belong here:

COSTA RICA: Forests of El Copey, alt. 1,800 m., *Tonduz* 11896. Viento Fresco, Provincia de Alajuela, alt. 1,800 m., *Standley & Torres* 47895. Santa María de Dota, Provincia de San José, alt. 1,500 m., *Standley* 42838; *Standley & Valerio* 43359. Near Quebradillas, Provincia de San José, *Standley* 42865. Cerro de las Caricias, Provincia de Heredia, alt. 2,000 m., *Standley & Valerio* 51943. Yerba Buena, *Standley & Valerio* 49028.

Here may be referred also two stones received from Dr. E. W. Berry, who found them on the beach in Panama at Panama and San Miguel bays. These stones may have come from Panama or Costa Rica, or possibly, of course, from some other region. It is to be expected that some species of the genus will be found in the mountains of northern Panama.

Calatola costaricensis is a frequent tree in the mountains of central Costa Rica, growing in moist or wet forest at altitudes of 1,500 to 2,000 meters. It is a large tree with rather smooth but scaly bark, and there is nothing about its appearance to attract attention. The curious fruits, which often are abundant upon the ground, are noticed immediately, however, for they are quite unlike any other with which one is familiar.

The tree first came to my attention this year at Santa María, where it was rather common. The fruits were shown to several persons, all of whom knew them, but were uncertain as to their name. The name "duraznillo" was given by some, but this is probably incorrect, although the stones do suggest somewhat peach pits, as that name would indicate. I was given also the name "erepe," and this is probably correct, since it is reported also by *Tonduz* from El Copey.

On the slopes of the volcanoes of Barba and Poás the tree is well known, and called "palo de papa" (potato tree), "papa de palo," and "palo azul." I was told at Fraijanes that *palo de papa* and *palo azul* were different trees, but a guide, to whom fruits were shown, said they were those of *palo azul*, while he gave the name *palo de papa* for the dry stones from which the flesh had been stripped. The name *palo azul* probably refers to the fact that the leaves often have a bluish cast, or perhaps to the fact that, as in *C. mollis*, a blue coloring material is found in the seeds, although I did not note any blue coloration in the seeds that we examined.

The wood of this tree is said to be of good quality and to be used sometimes for construction purposes. The most important and interesting product of the tree is the seeds. They are white, of firm consistency, and have a pleasant sweet flavor suggesting coconut. By the people who live on the slopes of Barba and Poás the seeds are roasted and eaten. They are also ground and mixed in tortillas, the tortillas thus made having the agreeable flavor of those prepared with grated cheese.

Prof. Valerio and myself ate some of the fresh seeds found at Yerba Buena,

and found them very good. We also ate roasted seeds, but found them less agreeable, perhaps because they had not been roasted properly.

While Mr. H. Pittier was in Washington recently, *Calatola* seeds were shown him. He recognized them immediately, and recounted that once, while lost in the mountains of Costa Rica, and without food, he ate some of the seeds and was made very sick by them. It seems probable, therefore, that the seeds of *C. costaricensis* possess the properties ascribed to those of the Mexican species.

The stones of *Calatola costaricensis* exhibit considerable variation in size and form, those from the region of Santa María being longer and narrower than those from the central cordillera. It may be that when more ample material has been assembled, it will be found that two species are represented in Costa Rica.

BOTANY.—*Five new American Melampodiinae.*¹ S. F. BLAKE,
Bureau of Plant Industry.

This paper contains descriptions of five new tropical American *Asteraceae* of the subtribe *Melampodiinae*, as well as a record of range extension for a unique species of *Ichthyothere* described in this Journal several years ago.

Clibadium laxum Blake, sp. nov.

Section *Euclibadium*; plant strigillose; leaves large, ovate, long-petioled, serrate, submembranous; heads medium-sized, remote, in very loose divergent-branched panicles; phyllaries 1-2; pistillate flowers 9, hermaphrodite 10-13; fertile ovaries pubescent at apex.

"Branched herb, 2-2.5 m. high;" stem stout (7 mm. thick above), pithy, indistinctly about 6-angled, rather densely short-strigose; leaves opposite, those subtending the upper branches of the inflorescence alternate; petioles strigillose, sulcate above, margined above by the decurrent leaf blades, the naked portion 2.5-9 cm. long; blades ovate, those below the inflorescence more broadly so, 23.5 cm. long, 15 cm. wide, acuminate, at base truncate-rounded and shortly decurrent on the petiole, those subtending the principal branches of the inflorescence long-acuminate, cuneate at base, 14-20 cm. long, 6-9 cm. wide, all thin, nearly equally green on both sides, coarsely and bluntly serrate (teeth mucronulate-tipped, depressed, 2-3 per cm.), lepidote-strigillose and barely roughish above (the hairs mostly deciduous except for the bases), sparsely strigillose beneath, tripli- or quintuplinerved within 4.5 cm. of base, the veins prominent beneath, the principal veinlets prominulous; panicles many-headed, very loose, ternately divided, about 17 cm. wide, strigillose, on peduncles 8 cm. long or less, the bracts subulate-filiform, 2-6 mm. long; heads sessile, remote (usually 3-10 mm. apart), in flower oblong, 6 mm. long, 3.5 mm. thick, in fruit depressed-globose, 3.5 mm. long, 4.5 mm. thick; phyllaries 1 or 2, ovate to suborbicular-ovate, 3 mm. long, 2.2 mm. wide, acutish to obtuse, 5-7-nerved, ciliate, sparsely strigillose, whitish, subscarious; pistillate flowers 9, all paleate, the hermaphrodite 10-13, all but the 2 or 3

¹ Received July 30, 1926.